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ABSTRACT

This paper describes a project addressing the assistive technology training needs of teachers of children with disabilities in rural eastern North Carolina, through development of a multimedia software tutorial service. The project utilized both a special education/assistive technology professional and an instructional technology professional to collaboratively develop a prototype tutorial. This paper describes the design and testing of the tutorial, which provides an introduction to the Unicorn Expanded Keyboard. The tutorial's development is summarized through four stages: (1) preparation and planning; (2) design; (3) programming the lesson; and (4) evaluation. Key features of the tutorial include its focus on two major competency domains previously identified for North Carolina teachers: using everyday software and hardware; and integrating technology into the curriculum, fitting it to the user's characteristics, and identifying and evaluating software programs. (Contains 10 references.) (DB)

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Preparing Special Educators in Eastern North Carolina to Use Assistive Technology: A Multimedia Approach to Addressing Training Needs Unique to Rural Areas

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Access to microcomputers and other assistive technologies for purposes of communication, education, and independent living continues to improve for persons with disabilities. Yet, students receiving special education in many rural areas fail to receive information or training concerning the available assistive technology options. The problem stems from more than a lack of equipment or funds. It comes from a basic lack of knowledge on the part of special educators concerning what assistive technologies are available, and further, how to obtain and use them with students (North Carolina Department of Public Instruction, 1992; Coleman et al, 1991; North Carolina Assistive Technology Project, 1992).

This paper describes a project in which the authors are addressing the assistive technology training needs of teachers in rural eastern North Carolina through a multi-media software tutorial series. The prototype tutorial, which is described here, was developed collaboratively by a special education/assistive technology professional and an instructional technology professional using a sythesized version of several exemplary courseware authoring process models (Alessi & Trollip, 1992; Allred & Locatis, 1988; Briggs, 1991; Dick & Carey, 1990; Fitzgerald, 1991; Anderson, 1991). One unique aspect of this project is that it explores the issue of efficient and effective collaboration between software developers and subject matter experts. Previous research suggests that improved software products will result from improved methods of collaboration (Darrow, 1992).

The remainder of this paper describes the design and testing process used in developing a prototype teacher training tutorial. The subject of the tutorial is "Introduction to the Unicorn™ Expanded Keyboard". Figure 1, below, shows a graphic representation of the procedure used for design and testing. Readers interested in receiving a copy of the prototype or the rest of the tutorial series (in the production process) are encouraged to request the software from the authors.

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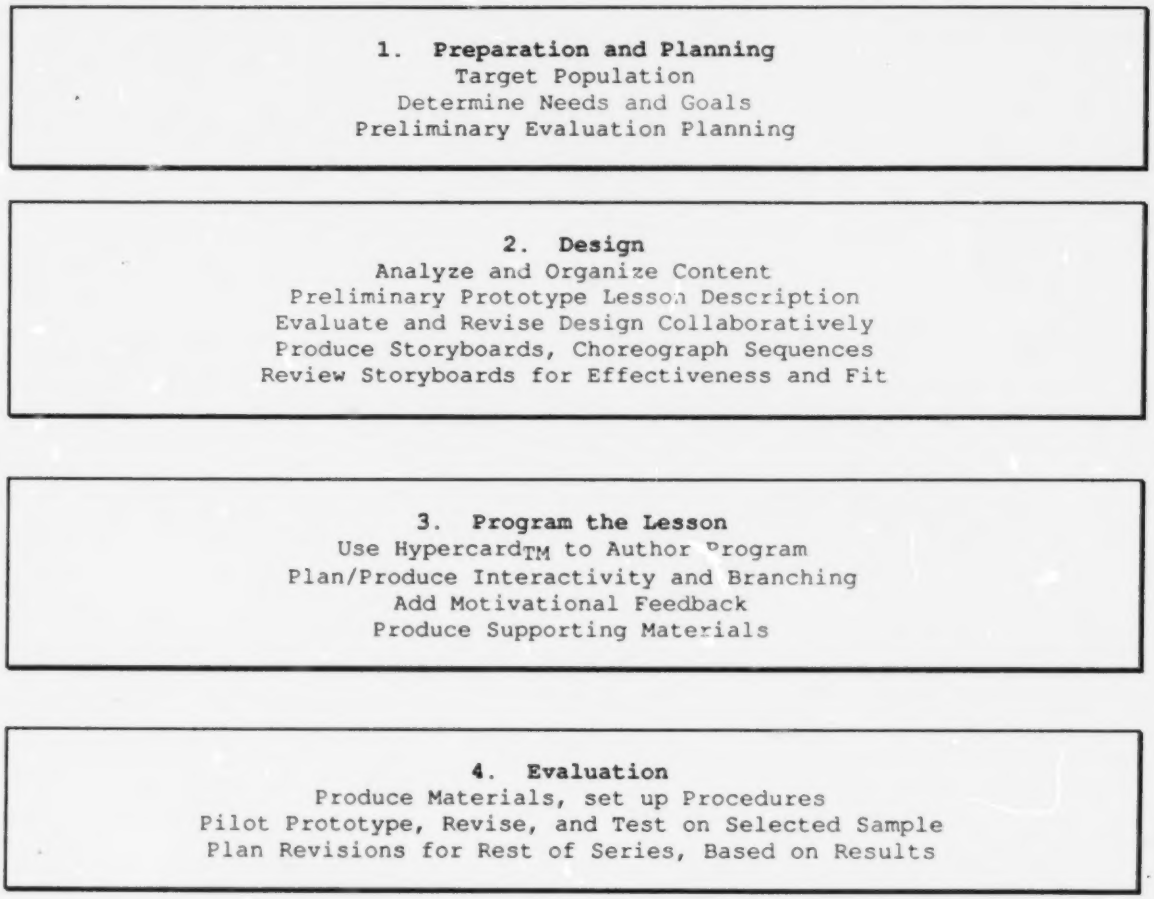
Figure 1. The Tutorial Design Procedure


1. Preparation and Planning
Target Population
Determine Needs and Goals
Preliminary Evaluation Planning
2. Design
Analyze and Organize Content
Preliminary Prototype Lesson Description
Evaluate and Revise Design Collaboratively
Produce Storyboards, Choreograph Sequences
Review Storyboards for Effectiveness and Fit
3. Program the Lesson
Use Hypercard™ to Author Program
Plan/Produce Interactivity and Branching
Add Motivational Feedback
Produce Supporting Materials
4. Evaluation
Produce Materials, set up Procedures
Pilot Prototype, Revise, and Test on Selected Sample
Plan Revisions for Rest of Series, Based on Results

The Preparation and Planning Stage. The target population included special education teachers in rural eastern North Carolina. Training needs and goals to be addressed in the training were drawn from several sources of identified technology competencies necessary for teachers (Blackhurst, 1992; Thibodeaux, 1992). The competencies were summarized and prioritized according to a logical learning sequence. The list of competencies was compared with information from various needs assessments (North Carolina Dept. of Public Instruction, 1992; Coleman et al, 1991; North Carolina Assistive Technology Project, 1992), and two major competency domains were identified as those to be covered by the tutorial series: Competency 1. Use, maintain, and trouble-shoot with everyday software and hardware (including basic computer skills, individual information on adaptive hardware devices, purpose of specialized adaptive peripherals, how to hook them up, compatibility with systems, and so on); and Competency 2. Integrate technology into the curriculum, fitting it to the user's characteristics. Identify evaluate and select software programs

appropriate for computer assisted instruction (including IEP goal development).

A preliminary plan for evaluating the software was designed. Formative evaluation would involve piloting the tutorial with persons familiar with both Hypercard$_{TM}$ and assistive technology. Appropriate persons were asked to participate. Summative evaluation would involve a selected sample of school of education students at East Carolina University, who would use the tutorial, rate its effectiveness, and suggest revisions to future developments.

The Design Stage. During this phase of development, the authors analyzed and organized the content to be covered, developed a preliminary prototype lesson description, then evaluated and revised the design as a team, using effective educational practices as a guideline. Paper storyboards were produced, and choreographing and production of written and spoken text, photographs and graphics were planned. The storyboards were also reviewed by the team for fit to the competency areas identified during preparation, and revised as necessary.

The Programming Stage. Hypercard$_{TM}$ was used to author the program. The actual programming was carried out by the instructional technology expert of the team. The rest of the team assisted in reviewing the program, and planning for interactivity and branching sequences. The team also helped to add motivational feedback to the program and produced supporting materials such as instructions for starting up, and reference and product lists.

The Evaluation Stage. Evaluation materials were produced collaboratively. A pre- and post- test procedure was piloted on three students, and then revised by the team. A total of 10 persons participated in the ensuing field test of the tutorial, using the revised version of the test. The sample included students in social work, education, occupational therapy, therapeutic recreation, math education, counselor education, nutrition, instructional technology, and special education. All of the members of the sample reportedly had had at least some experience with computers and most had experience working with people with disabilities. Persons in the sample ranged in age from 19 to 33. Each person filled out the pre-test, which asked for basic content knowledge concerning the Unicorn keyboard and assistive keyboards in general. Then the participants underwent the actual tutorial program. After completing the program, each participant was again asked content questions based upon information provided in the tutorial, as well as questions concerning their satisfaction with the tutorial as a program. Responses were generally favorable. An average of 60% knowledge gain in the content area was shown. All respondents reported enjoying the tutorial and an interest in receiving future programs in the series. Areas identified through the field test for revision in future tutorials were the following: (a) Respondents all complained that the audio was not as clear as it could be; (b) Some respondents thought that they could remember more content if fewer pieces of information were presented per page; (c) Most respondents loved the photographs and graphics and urged us to move toward using more of them; and (d) Most respondents had difficulty with start-up and shut-down and suggested that we simplify the directions for doing so. All of these responses will be considerations in future productions.

Another type of evaluation was a post-production meeting of the team, in which the use of a collaborative team in this type of production was informally assessed. All members reported great satisfaction in the process as well as the outcomes, and great enthusiasm for continued efforts. The instructional technologist reported gaining better understanding of assistive technology and

special needs, while the special educators reported gaining insight into what would be possible in the production of future tutorials. Production of a series of similar multimedia tutorials covering topics in assistive technology is now in the planning stages, and external funding is being sought for continued work in this area.

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